

CUSTOMER NO.: 38107

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of) Examiner: B. ROY
J. YANOF, et al.)
Serial No.: 09/990,518) Art Unit: 3737
Filed: November 21, 2001) Confirmation: 3075
For: **METHOD OF REVIEWING**)
TOMOGRAPHIC SCANS)
WITH A LARGE NUMBER)
OF IMAGES)
Date of Examiner's Answer:)
September 26, 2007)
Attorney Docket No.:) Cleveland, OH 44114
PKRZ 2 00718 /PHUS017057US) November 19, 2007

REPLY BRIEF

Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This Reply Brief is responsive to the Examiner's Answer of September 26, 2007.

The applicant and the Examiner are in agreement in connection with Sections (1)-(8) and (11).

Section (9) Grounds of Rejection appears to be a word for word repeat of the Final Rejection. Because Section (9) raises no new issues, the applicant is not entitled to respond to Section (9) in this Reply Brief.

CERTIFICATE OF ELECTRONIC TRANSMISSION

I certify that this REPLY BRIEF and accompanying documents in connection with U.S. Serial No. 09/990,518 are being filed on the date indicated below by electronic transmission with the United States Patent and Trademark Office via the electronic filing system (EFS-Web).

November 20, 2007

Date

Patricia A. Heim

Patricia A. Heim

(10) Applicant's Response to Examiner's Argument

- (a) Claims 1-5 and 20 distinguish patentably over Horiuchi as modified by Lonn, as further modified by Wood

First, the Examiner's arguments fail as a matter of law. Wood is not *per se* prior art against the present application because Wood was not filed prior to the filing date of the present application. Wood is only prior art to the extent that subject matter disclosed in Wood is also disclosed in earlier provisional applications Ser. Nos. 60/314,582 or 60/252,743 (the Wood published application asserts to a be a continuation-in-part of application Ser. No. 09/946,209, but when Wood issued as US 6,925,200, that claim for priority was dropped. A cursory review of US application Ser. No. 09/946,209 shows that Wood was not entitled to claim the benefit of its filing date. US application Ser. No. 09/946,209, which was published as US 2002/0076091 and issued as US 6,574,357 has no inventors in common with Wood and, other than both pertaining to diagnostic imaging, there is substantially no overlapping subject matter). The subject matter of US application Ser. No. 60/252,743 was subsumed into provisional application Ser. No. 60/314,582.

In the Arguments, the Examiner relies on paragraphs [0043]-[0046] of Wood. Paragraph [0043] of 60/314,582 was rewritten and increased three-fold. All of the subject matter starting at page 3, column 2, line 2 of Wood is new. Paragraphs [0044] and [0045] are completely new. In Ser. No. 60/314,582, there is a paragraph which starts on line 20 of page 6 which resembles paragraph [0046] of Wood, but has been so substantially rewritten that paragraph [0046] of Wood does not, as written, constitute prior art.

Because the Examiner's argument relating to the patentability of claims 1-5 and 20 relies on portions of Wood which are not prior art, the argument must fail as a matter of law.

Second, the Examiner's arguments are misleading and inaccurate in the sense that the Examiner confuses, intermixes and uses interchangeably: the images, the raw CT data from images are reconstructed, and, possibly, the axial slices or sections of the patient which are imaged.

Claim 1 calls for a display which displays "image slices". Thus, the present application relates to images and the combining of images. Images are reconstructed from raw data, radiation absorption data in the case of CT, and depict the radiation absorptive properties of the tissue in the corresponding axial slice or section of the patient. The Examiner asserts that various sections of Horiuchi address "slices". In point of fact, the sections to which the Examiner is referring refer to the raw CT absorption data which will later be reconstructed into images. Because the portions of Horiuchi upon which the Examiner is relying relate to raw CT data; whereas, claim 1 refers to images, it is submitted that the Examiner has not shown the claimed concepts in the references and her arguments must fail.

The Examiner's statement on lines 9 and 10 of page 7 is incorrect. The Examiner states "therefore images representing the thinner 7-mm and 3-mm slices are combined to generate images representing the thicker 10-mm slices". This statement is contrary to the clear disclosure of Horiuchi. As stated at column 5, lines 31-36, Horiuchi concurrently detects two sets of projection data (the 3 mm set and the 7 mm set) using a first detector row 240 and a second detector row 242. Once a set of 3 mm data and a set of 7 mm data have been collected, the 3 mm and 7 mm data are combined (added or averaged) to form 10 mm data set (column 7, lines 5-8). This provides three projection data sets - a 3 mm data set, a 7 mm data set, and a 10 mm data set. The three data set are reconstructed in three computationally intense reconstruction processes. The 10 mm data set and the 7 mm data set are reconstructed using a low frequency band-enhancing reconstruction function (column 7, lines 36-42) to provide images having good definition of the parenchymal portions of the internal tissue. By contrast, the projection data set for the 3 mm slice is reconstructed using a high frequency band enhancing reconstruction function to provide a tomographic image having good definition of the details of internal tissue (column 7, lines 42-45).

Contrary to the Examiner's assertion, Horiuchi does not suggest combining the 3 mm images and the 7 mm images. Indeed, because the 3 mm and 7 mm images have been reconstructed with reconstruction functions which provide them with different image properties, there would be no motivation to make such a

combination nor is there any suggestion in Horiuchi that such combined images with different properties would have any particular diagnostic value.

Thus, to the extent that the Examiner's arguments suggest that Horiuchi discloses combining images, it is submitted that the Examiner's arguments are misleading or incorrect.

The Examiner's assertion that Lonn combines thinner image slices is again flawed for analogous reasons. Specifically, Lonn is concerned with combining raw CT image data prior to reconstruction. Lonn has a plurality of rows of detectors in array 14. Rather than merely combining the data from adjacent rows as in Horiuchi, Lonn suggests that one should weight the data from the various rows (column 3, lines 20-30). This weighting might range from 0 to 1, for example, with elements of the center(s) rows being weighted 1 with data from detectors in adjacent rows being weighted progressively less (column 6, line 36 – column 7, line 5). Thus, Lonn, like Horiuchi, suggests combining the data collected from a plurality of rows of detectors prior to image reconstruction; whereas, claim 1 addresses combining the reconstructed images.

The portion of Wood addressed by the Examiner refers to Figure 5, which shows a display divided into three view ports. View port 520 is a volume image of both lungs, image 530 is a magnified volume image of a small area of the lung of interest, and image 540 is a transverse image slice through the lungs along the white indicator line shown in image 520. Thus, Wood suggests showing two volume images and a slice image. Although Figure 5 of Wood shows multiple view ports, contrary to the Examiner's assertions, these view ports do not display thick and thin slices. Figure 5 again displays one slice of a given thickness with no suggestion of generating or displaying images slices representing other slice thicknesses concurrently displaying two image slices depicting a common region, but with different thicknesses.

After pointing out portions of the applied references which discuss combining raw CT data prior to reconstruction, the Examiner proceeds to conclude that the references clearly show combining the images, particular image slices, to generate a second image slice of a greater thickness. Again, the cited references combine raw data which can be reconstructed into a thicker image slice; whereas,

claim 1 calls for combining a plurality of the first or thin image slices which thin image slices are displayed on the first view port to obtain a second or thicker image slice that is displayed in a second view port. Because Horiuchi and Lonn, as pointed out by the Examiner in her arguments, relate to the combining of raw data prior to reconstruction; whereas, claim 1 of the present application relates to combining images after reconstruction, it is submitted that the Examiner has not demonstrated that the limitations of claim 1 or claims 2-5 dependent therefrom are shown, much less are obvious over the prior art.

b) Claims 6-8 are patentable in the sense of 35 U.S.C. § 103 over Horiuchi as modified by Wood

The Examiner starts her arguments in Section (b) with a non sequiter by arguing:

The Appellant argues that Horiuchi does not combine images, combining thinner images to generate a thicker image. Horiuchi clearly states obtaining contiguous slices or a continuous scan of the entire lung with thick and thin slices (col. 1, lines 43-49, col. 6, lines 61-67, col. 7, lines 28-30).

Indeed, the applicant does argue that Horiuchi does not combine images. Horiuchi combines raw CT data, particularly the outputs of detectors rows 240, 242 prior to reconstructing an image. Once 3 mm, 7 mm, or 10 mm images have been reconstructed, Horiuchi makes no suggestion of combining such images. Indeed, because the 3 mm image slices of Horiuchi, as discussed above, were purposely reconstructed to have different characteristics than those of the 7 mm and 10 mm slices, it is submitted that there is a reason why Horiuchi does not combine these images and that Horiuchi provides no motivation to do so.

Over the next 8 lines, the Examiner continues to refer to the raw image data of Horiuchi as "slices". Perhaps this inaccurate use of "slices" then leads to the erroneous conclusion in the antepenultimate and penultimate lines of page 8 that images are combined. Again, as repeatedly set forth above, Horiuchi combines raw data and reconstructs the 10 mm image slice from such combined raw data. Horiuchi does not reconstruct the raw 7 mm data into a 7 mm image and the raw 3 mm data

into a 3 mm image and combine the 3 mm and 7 mm images to generate the 10 mm image. Horiuchi teaches against doing so by reconstructing the 3 mm and 7 mm images using different reconstruction functions or order to emphasize different image characteristics in the 3 mm and 7 mm images.

The Examiner's page 9 arguments continue to confuse and equate raw data which is reconstructable into images with images. Note that claim 6 calls for a combining means which combines a plurality of first image slices to generate the second image slices. The display means displays these very same first image slices and second image slices. Thus, claim 6 is clearly calling for a process which combines images. By contrast, the Examiner's arguments are directed to references which combine raw image data, which raw data the Examiner labels as "slices", creating confusion. It is submitted that the Board should reject the Examiner's attempt to equate two different things, pre-reconstruction absorption data and post reconstruction images, merely by calling them both slices when the references clearly show that the reference absorption data are different from the images or image slices in the claims. Specifically, the Examiner's calling the raw data "slices" does not make the raw data an image which is displayed on a display device. Note that in order to obtain a 3 mm, 7 mm, and 10 mm image slice, Horiuchi needs to perform three image reconstructions. Image reconstructions are very computationally intensive, and even with high speed computers, requires significant computing time. By contrast, the present application only needs to perform the reconstruction process to generate the first (thin) image slices. As set forth in claim 6, the second image slices are generated by combining the previously reconstructed first image slices. Thus, no additional reconstruction operation is needed to generate the second or thick image slices.

Claim 15 calls for generating the second 2D images from subsets of the first 2D images by merging the first images together. The "slices" which the Examiner attributes to Horiuchi describe raw attenuation data which has not as yet been processed and reconstructed into an image. None of the references set forth by the Examiner disclose, teach, or fairly suggest combining two or more thin images together to generate a thicker image. Rather, Horiuchi and Lonn both teach that a thick image should be generated by combining the raw data and performing a

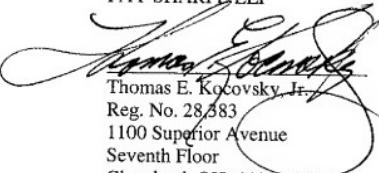
reconstruction process on the raw data. Wood does not address combining images, nor does Wood suggest concurrently displaying two images one depicting a thick slice through the patient and the other depicting a thin slice from within the thick slice.

CONCLUSION

For the reasons set forth in greater detail in the Appeal Brief and the additional arguments set forth above, it is submitted that all claims distinguish patentably over the references of record. An early reversal of the Examiner's rejection is requested.

Respectfully submitted,

FAY SHARPE LLP



Thomas E. Kocovsky, Jr.
Reg. No. 28,383
1100 Superior Avenue
Seventh Floor
Cleveland, OH 44114-2579
(216) 861-5582